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Committee on the Peaceful Uses of Outer Space

Thematic priority 6. International cooperation towards low-emission and resilient societies

Note by the Secretariat

I. Introduction

1. The fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space, in 2018 (UNISPACE+50), is a milestone that provides an opportunity to consider the current status of the Committee on the Peaceful Uses of Outer Space, its subsidiary bodies and the Office for Outer Space Affairs of the Secretariat, and define their future role in promoting international cooperation in the peaceful uses of outer space and shaping global governance of outer space activities.

2. In preparation for UNISPACE+50, the Committee, at its fifty-ninth session, agreed to seven thematic priorities (see A/71/20, para. 296): (a) Global partnership in space exploration and innovation; (b) Legal regime of outer space and global space governance: current and future perspectives; (c) Enhanced information exchange on space objects and events; (d) International framework for space weather services; (e) Strengthened space cooperation for global health; (f) International cooperation towards low-emission and resilient societies; and (g) Capacity-building for the twenty-first century.

3. Thematic priority 6, International cooperation towards low-emission and resilient societies, is aimed at achieving a major impact in four interdependent areas: disaster risk reduction, mitigation and adaptation to climate change, sustainable development, and resiliency of space-based systems.

4. The Office for Outer Space Affairs has been identified as the appropriate mechanism to develop and propose a road map under thematic priority 6 and report regularly to the Committee and its subcommittees on progress on international cooperation towards low-emission and resilient societies.

II. Background

5. The Office for Outer Space Affairs leads global efforts in promoting international cooperation in the peaceful uses of outer space, and in the utilization of space science and technology for sustainable economic and social development, in particular for the benefit of developing countries. The Office assists States Members of the United Nations in areas of international space law and policy and in regulatory

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frameworks governing space activities, and in strengthening the capacity of developing countries to use space science, technology and applications for development by helping to integrate space capabilities into national development programmes. The following mandates of the Office are of particular relevance in areas related to transparency, interoperability and resiliency:

(a) Maintaining the United Nations Register of Objects Launched into Outer Space and providing technical assistance to Member States and applicable organizations on issues relating to space law and the registration of space objects;

(b) Implementing the Programme on Space Applications, which enhances the understanding and subsequent use of space technology for peaceful purposes in general, and for national development in particular, in response to needs expressed in different geographical regions;

(c) Implementing the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), pursuant to General Assembly resolution 61/110, establishing the platform as a programme of the Office for Outer Space Affairs. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities. In addition to its headquarters in Vienna, where the Office for Outer Space Affairs is located, the programme also has offices in Bonn, Germany, and in Beijing. UN-SPIDER is currently supported by 21 regional support offices;

(d) The Office for Outer Space Affairs also acts as the secretariat to the Space Missions Planning Advisory Group (SMPAG) and works with the International Asteroid Warning Network (IAWN), both entities established as a result of the recommendations for an international response to the near-Earth object impact threat endorsed by the United Nations. SMPAG and IAWN work to strengthen preparedness in case of a potential impact of a near-Earth object through increased planetary defence efforts, for example, promoting opportunities for international collaboration on research and techniques for the deflection of near-Earth objects, recommending criteria and thresholds for notification of an emerging impact threat and recommending strategies on the basis of well-defined communication plans and procedures, with a view to assisting Governments in their responses to predicted impact consequences;

(e) Acting as the executive secretariat to the International Committee on Global Navigation Satellite Systems (ICG), established in 2005 under the umbrella of the United Nations, the Office also supports ICG in its activities to promote voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services, which in turn ensure interoperability and increase support for those services for the purposes of sustainable development, in particular for developing countries.

6. UNISPACE+50 provides a unique opportunity to review the current mandates and consider if and how they could be streamlined and reinforced to ensure that future capacity-building activities contribute to sustainable development and, in particular, to the successful implementation of the 2030 Agenda for Sustainable Development, and as an integral part of the "Space2030" agenda.

7. The "Space2030" agenda is a comprehensive and inclusive long-term vision for space, strengthening the contribution of space activities and space tools to achieving the internationally agreed development goals and strengthening the global governance of outer space activities, and is based on the principle of the peaceful exploration and use of outer space.

8. In the preparation for UNISPACE+50, and in particular with respect to thematic priority 6, the Office for Outer Space Affairs has been conducting a wide range of activities during 2017. The main activities have included, inter alia:

(a) The United Nations/Germany International Conference on International Cooperation towards Low-Emission and Resilient Societies — a flagship event for thematic priority 6;

(b) Training in West Africa on preparation for and mitigation of hazards;

(c) Follow-up to the UN-SPIDER technical advisory mission and trainings in Myanmar and Solomon Islands, and a technical advisory mission in Nepal;

(d) Training on the use of the UN-SPIDER knowledge portal and recommended practices;

(e) United Nations/United States of America Workshop on the International Space Weather Initiative: the decade after the International Heliophysical Year 2007;

(f) United Nations International Conference on Space-based Technologies for Disaster Risk Reduction: Building Resilience through Integrated Applications.

III. Objectives and challenges in the context of thematic priority 6

9. The objectives of thematic priority 6, on international cooperation towards low-emission and resilient societies, are as follows:

(a) Define synergies between climate change mitigation efforts, disaster risk reduction, global development and reducing emissions by replacing carbon energy with renewable energy;

(b) Develop a road map for enhanced resiliency of space-based systems and the affiliation of existing and future Earth observation, global navigation satellite system and telecommunication constellations for disaster risk reduction and climate change monitoring and mitigation;

(c) Improve integrated space application approaches and the interoperability of space-based systems and ground and in situ systems;

(d) Provide requirements to new developers for coverage in geographical areas not sufficiently monitored and for applications that need further development;

(e) Identify governance and cooperation mechanisms to support this objective.

10. In addition to the objectives of thematic priority 6 stated above, elements and challenges that need to be considered under the thematic priority are identified in three global agendas, namely the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Paris Agreement on climate change.

11. The integration of the three agendas and the objectives of the thematic priority is a challenging task, but it also provides opportunities to use space-based infrastructures in a more synergetic manner.

12. Specifically, the following challenges have been identified under each objective:

(a) Define synergies between climate change mitigation efforts, disaster risk reduction, global development and reducing emissions by replacing carbon energy with renewable energy:

(i) Space can contribute to the monitoring and achievement of the Sustainable Development Goals. In addition, space is clearly recognized by the Sendai Framework for Disaster Risk Reduction, and the implementation of the Paris Agreement could rely on space-based infrastructure to monitor the progress in

the fight against climate change. There is currently no mechanism to coordinate and exploit the synergies of space-based systems;

(ii) The Sendai Framework stipulates the need of a mechanism for disaster risk reduction in its guiding principles:

a. Disaster risk reduction requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge (para. 19 (g));

b. The development, strengthening and implementation of relevant policies, plans, practices and mechanisms need to aim at coherence, as appropriate, across sustainable development and growth, food security, health and safety, climate change and variability, environmental management and disaster risk reduction agendas. Disaster risk reduction is essential to achieve sustainable development (para. 19 (h));

(iii) The Paris Agreement, adopted by the Conference of the Parties of the United Nations Framework Convention on Climate Change on 12 December 2015, refers to the criticality of scientific knowledge and measurement accuracy, and is also a call for transparency and the sharing of information, both of which are applicable to space-based infrastructure in support of climate monitoring efforts:

a. Article 4-13: Parties shall account for their nationally determined contributions. In accounting for anthropogenic emissions and removals corresponding to their nationally determined contributions, Parties shall promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting, in accordance with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement;

b. Article 7-7: Parties should strengthen their cooperation on enhancing action on adaptation, taking into account the Cancun Adaptation Framework, including with regard to: (a) sharing information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies and implementation in relation to adaptation actions; (b) strengthening institutional arrangements, including those under the Convention that serve this Agreement, to support the synthesis of relevant information and knowledge, and the provision of technical support and guidance to Parties; (c) strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making;

(b) Develop a road map for enhanced resiliency of space-based systems and the affiliation of existing and future Earth observation, global navigation satellite system and telecommunication constellations for disaster risk reduction and climate change monitoring and mitigation:

Resilience is defined by the United Nations International Strategy for Risk Reduction (UNISDR) as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management". Therefore, the challenges put forward by this objective shall address the different areas described in the definition, namely, to identify and prevent hazards, increase robustness and provide the means for a timely recovery in case of failure;

(c) Improve integrated space application approaches and the interoperability of space-based systems and ground and in situ systems:

(i) The Sendai Framework, the 2030 Agenda and the Paris Agreement require systematic, global-to-local, continuous observation and location-based information on social, economic and environmental conditions in order to (a) improve the understanding of risks and the routine operation of multi-hazard early warning systems; (b) contribute to the implementation of measures geared towards mitigating and adapting to the effects of climate change; (c) assist societies in their efforts to achieve sustainable development without degrading the environment; and (d) monitor and evaluate requirements and reporting;

(ii) In order to achieve the Sendai Framework global target of substantially increasing the availability of and access to multi-hazard early warning systems and disaster risk information and assessments by 2030, the improvement of integrated space application approaches is necessary;

(iii) Integrated applications of satellite-based Earth observation, meteorology, communication and navigation are required to support the demands. Suitable constellations for satellite-based Earth observation, communication and navigation, as well as ground segments, data storage and archiving infrastructures are also needed;

(iv) There is a need to establish multilateral, multi-stakeholder cooperation mechanisms to plan, implement and maintain integrated space application approaches that leave no country behind;

(v) Added value can be created through the combined and complementary use of space-based systems and ground and in situ systems contributing to measuring and monitoring progress and informed decision-making;

(vi) Open-access information systems are required for the integration of data and information obtained by space application approaches;

(d) Provide requirements to new developers for coverage in geographical areas not sufficiently monitored and for applications that need further development:

(i) This cross-cutting area presents challenges from the perspectives of both the provider and the user;

(ii) From the provider's perspective, the challenge is to get as much open access to space-based information in order to make available images of various resolutions that contribute to building resilience. Beneficial returns on providing free access are well demonstrated by the practices of Landsat and the Copernicus Open Access Hub (previously known as Sentinels Scientific Data Hub);

(iii) Additionally, there is a need for coordination in the planning related to, inter alia, space assets, solutions and data archives, in order to ensure the availability of the right data at the right time;

(iv) Data cannot be fully utilized without appropriate tools; hence, the need to ensure open access to tools, models and applications;

(v) From the user's perspective, harmonization of user requirements, giving priority to reaching geographical areas that are not sufficiently monitored, is important in order to ensure that no one is left behind;

(e) Identify governance and cooperation mechanisms to support this objective:

(i) Because of the need for an integrated approach and the intrinsic complexity of each of the four areas of thematic priority 6, solid coordination of the multiple providers of space-derived data, information, services and products is required;

(ii) The role of space-based science and technology in the context of the global agendas is essential. In view of the scale of actions needed to establish data collection systems, provide capacity-building and promote the benefits of

space-based science and technology, global, regional and national partnerships are necessary and must be well coordinated.

IV. Road map for implementation

13. Developing an implementation plan is crucial to achieving the broad objectives of thematic priority 6, and it is understood that it will be a joint, integrative process based on internal and external consultations. Broad, inclusive and open stakeholder consultations will be held, including with partners to formulate the Office's road map for the thematic priority 6. In the road map, the Office aims to:

(a) Enable collaborations based on trust;

(b) Empower the stakeholders and parties involved;

(c) Promote agility to adapt to emerging, rapidly changing and complex situations;

(d) Enable strengthened and efficient cooperation and networking;

(e) Provide a safe space for cooperation for the stakeholders and parties involved.

Initiatives and related objectives

14. The different initiatives contributing to thematic priority 6 are defined under each of the following objectives.

1. Define synergies between climate change mitigation efforts, disaster risk reduction, global development and reducing emissions by replacing carbon energy with renewable energy

15. Mindful of the usefulness of space technology applications in disaster risk reduction, the Office for Outer Space Affairs, through UN-SPIDER and with more than 20 additional partners representing international, regional and national institutions, launched the Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR) during the Third World Conference on Disaster Risk Reduction, held in Sendai, Japan, in March 2015. The Office also joined forces with the World Meteorological Organization, the United Nations Development Programme, the Global Facility for Disaster Reduction and Recovery of the World Bank, the Economic and Social Commission for Asia and the Pacific and other international, regional and national institutions to launch the International Network for Multi-Hazard Early Warning Systems. It is recommended that those initiatives and the related partnerships be strengthened.

16. In that respect, it is recommended that the Office further address the common challenges of disaster risk reduction, climate change and sustainable development, which are linked in the 2030 Agenda; accordingly, common efforts must accomplish the following:

(a) The Office for Outer Space Affairs, through UN-SPIDER, should deliver on the targets of the Sendai Framework. This is to be achieved by a deeper engagement with Member States through technical advisory support and services, supporting initiatives including GP-STAR, the International Network for Multi-Hazard Early Warning Systems and efforts geared towards improving single- and multi-hazard early warning systems, including systems focusing on climate-related disasters such as floods and droughts. Partnerships must facilitate the integration of in situ and space-based information for the purposes of cross-validation and complementarity, in support of disaster risk reduction activities, and for a better understanding of disaster risks and the related drivers. The operational routines of single and multi-hazard early warning systems must be improved. The Office should

also continuously promote, where relevant, the development of integrated applications comprising Earth observation and global navigation satellite system and telecommunication constellations to reduce disaster risk and monitor and mitigate climate change and adapt to it;

(b) The Office should have a strengthened role in supporting key actors in the development, design and implementation of an observation system;

(c) There should be efforts to enhance the combined and complementary use of space-based and in situ information to improve early warning systems, risk assessment methodologies and multi-hazard early warning systems.

17. In particular, the points in subparagraphs (b) and (c) above are addressed by the global space partnership for the Sustainable Development Goals proposed by the Office at the sixtieth session of the Committee.

18. The global space partnership for the Sustainable Development Goals would have the following primary objectives: identify the needs of countries and foster the availability of space system capacity to meet those needs; solve problems and overcome existing gaps and constraints that prevent countries from making full use of space assets; and make ongoing global actions more cost-effective through greater coordination.

19. In the Paris Declaration "Towards a space climate observatory" issued by the One Planet Summit on 12 December 2017, space agencies proposed the establishment of a global climate observatory based on systematic observations of essential climate variables, data validation and intercalibration, a strategic architecture integrating space and in situ data and related models, and a policy espousing free and open data. A global climate observatory could make an invaluable contribution to the "Space2030" agenda and would benefit from initiatives under the global space partnership for the Sustainable Development Goals, providing opportunities to carry out the 2030 Agenda more efficiently.

2. Develop a road map for enhanced resiliency of space-based systems and the affiliation of existing and future Earth observation, global navigation satellite system and telecommunication constellations for disaster risk reduction and climate change monitoring and mitigation

20. A road map for enhanced resiliency and the affiliation of existing systems should take into consideration and build upon any guidelines for the long-term sustainability of outer space activities that may be adopted by the Committee.

21. It is recommended that discussions on the protection of space assets, space systems and ground infrastructures, including the related critical infrastructures, be held within the Committee, including discussion of cybersecurity as it relates to space activities.

22. It is recommended that the Office further explore synergies between the UN-SPIDER programme and its global network of the regional support offices, SMPAG and IAWN, in order to strengthen preparedness and increase the reach of awareness-raising campaigns, in particular in Member States without capabilities in that area.

23. Greater coordination of operational space weather services could better protect space assets, improving global resilience against the effects of space weather.

24. There should be enhanced cooperation and coordination between the Office for Outer Space Affairs and other United Nations entities and programmes, including the Office for Disarmament Affairs, in capacity-building efforts for the safety, security and sustainability of outer space activities, including in the area of transparency and confidence-building measures in outer space activities.

3. Improve integrated space application approaches and the interoperability of space-based systems and ground and in situ systems

25. The Office for Outer Space Affairs is committed to the following:

(a) Accelerating international cooperation, with a view to enhancing the use of space technologies and applications in climate change efforts;

(b) Advocating for open access to space-based data in order to assist in the planning and implementation of measures targeting mitigation, adaptation, and loss and damage;

(c) Carrying out capacity-building efforts in developing countries, with a view to effectively using space technologies as a means of contributing to the implementation of the Paris Agreement.

26. Space-related infrastructure, data, information and integrated services can play a crucial role in achieving the Sustainable Development Goals only if such services are accessible and used in an inclusive approach involving all stakeholders at the country level, and are integrated into the global efforts to achieve the Goals. The global space partnership could assist in achieving the Sustainable Development Goals by ensuring that the space community's contributions are relevant, timely and accessible to individual countries. Both institutional and private actors would have to be involved in that undertaking, in order to close existing gaps that prevent countries from making full use of space assets and demonstrate how space can contribute to achieving the objectives of the 2030 Agenda.

4. Provide requirements to new developers for coverage in geographical areas not sufficiently monitored and for applications that need further development

27. A key process of the global space partnership for the Sustainable Development Goals is to conduct a review to determine the needs of users. That process will involve conducting individual country assessments and defining set of actions to undertake for each of the Sustainable Development Goals and their relevant targets. The consolidated findings will provide a global picture of existing needs and gaps.

28. The requirements will be used to coordinate space system capacity as a means of improving and facilitating access to and the availability and use of space assets. An example of such activity is the affiliation with upcoming global and regional constellations such as the satellite constellation of the BRICS countries (Brazil, China, India, the Russian Federation and South Africa) in order to provide requirements to new developers for coverage in geographical areas that are not sufficiently monitored and for applications that need further development.

29. It is recommended that UN-SPIDER consolidate coordination and cooperation with a wide range of United Nations entities and other international organizations so that the unique role played by the Office for Outer Space Affairs can benefit the most vulnerable nations, which are lacking in disaster risk monitoring capability.

30. The Office is developing partnerships, including with the European Space Agency, to establish a compendium of space solutions, with a view to making accessible a comprehensive set of technical, institutional and policy solutions for countries to use in planning, monitoring and measuring their actions towards the attainment of the Sustainable Development Goals. The implementation of solutions from the compendium is to be planned from a detailed and well-supported assessment of needs and requirements through a "space for development profile".

5. Identify governance and cooperation mechanisms to support this objective

31. The Office for Outer Space Affairs is increasingly aligning its activities with the Sustainable Development Goals, with the aim of being a facilitator on the use of space applications in the development arena and fulfilling the objectives set under thematic priority 6. This is to be achieved through the global space partnership for the Sustainable Development Goals, which would establish a platform for dialogue and

coordination of the use of space technology in support of the achievement of the 2030 Agenda for Sustainable Development.

32. The establishment of a global space fund for development has been proposed, similar to existing United Nations funding mechanisms, in order to support the coordination and implementation of activities of the global space partnership for the Sustainable Development Goals.

V. Key milestones for thematic priority 6

33. In forming the global space partnership for the Sustainable Development Goals, the following approach is recommended:

(a) *Step 1. Partnership definition and approval (July 2017–June 2018).* During this phase, the feasibility assessment should be completed, and all documents defining the partnership should be prepared in consultation with the key partners. The focus should be on properly laying the groundwork for the activation of the core processes in the second half of 2018, which will involve analysing the relevance of space assets to each Sustainable Development Goal target or indicator and defining existing gaps and priority for action;

(b) *Step 2. Partnership build-up phase (July 2018–June 2021).* This phase involves the progressive implementation of the various activities, giving priority to management and coordination issues and the core processes. At the end of step 2, the partnership is expected to be fully operational;

(c) *Step 3. Regular operations (beginning July 2021).* Governance and main processes should be in place and functioning. The partnership will have acquired the expected authoritative role in coordinating the availability of space assets in support of the Sustainable Development Goals and in fostering and facilitating their use.

34. A long-term strategy for the implementation of the UN-SPIDER programme should be developed and initiated. The Office for Outer Space Affairs should expand its regional presence to cover important regions. This could include establishing a liaison office in Bangkok to cover the Asia-Pacific region, reinforcing the Beijing office in order to expand the geographical coverage of the current UN-SPIDER programme, and broadening the spectrum of activities of the Bonn office in terms of technical contents and knowledge-based services. By 2030, it is expected that the UN-SPIDER programme will have widened its reach beyond the disaster risk reduction community to include the key stakeholders involved in climate change adaptation and mitigation, and in sustainable development. UN-SPIDER will need to establish facilities offering technical services in order to increase support to Member States in implementation of General Assembly resolution 61/110.

35. The long-term strategy for implementation of the UN-SPIDER programme calls for Member States to provide financial resources allowing the Office for Outer Space Affairs to reinforce its relationships with United Nations entities and other relevant international organizations based in New York and Geneva.

VI. Conclusions

36. Because of the need for an integrated approach and the intrinsic complexity of each of the four areas of thematic priority 6, solid coordination among the providers of space-derived data, information, services and products is required. At the sixtieth session of the Committee on the Peaceful Uses of Outer Space, the Office for Outer Space Affairs proposed the establishment of a global space partnership for the Sustainable Development Goals.

37. The Office for Outer Space Affairs believes that such a global space partnership will lead to greater recognition of the benefits of space science and technology, which will in turn facilitate the implementation of the 2030 Agenda for Sustainable

Development. The global space partnership for the Sustainable Development Goals, with the Office as the leading partner, is a key element for the fulfilment of the objectives under thematic priority 6.

38. The partnership will also support the attainment of the objectives of the Sendai Framework for Disaster Risk Reduction and the Paris Agreement. The Office for Outer Space Affairs is already playing a key role in that respect, including through the UN-SPIDER programme, although the capacity and scope of that role has to be strengthened.

39. In that regard, a global climate observatory could make an invaluable contribution to the "Space2030" agenda and could benefit from initiatives under the global space partnership for the Sustainable Development Goals in implementing the 2030 Agenda for Sustainable Development.

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